

WA-Trans Data Standards – Version 4.0

(Report compiled by Mark L. Hotz)



1.0 Introduction

The Washington Statewide Transportation Framework Project (WA-Trans) was organized to create an electronic map and spatial data set of transportation data for use in Geographic Information Systems (GIS) across the state. The WA-Trans partners have delegated the development of the Transportation Framework Data Standards to the WA-Trans steering committee. These standards are comprised of road, rail, transit, ferries, air, and non-mechanized transportations modes. The data standards will be used as a guideline for data collection during two pilot projects in the Puget Sound and along the Oregon-Washington border. These standards will be adjusted as necessary as experience is steadily being acquired during these pilot projects.

1.1 Mission and Goals of the Data Standards

The WA-Trans Data Standard will enhance the will and ability of partners to collect and maintain the data, and to allow data quality to improve over time for long-term data maintenance and updates. This process will also help participants recognize the capabilities of existing technology and upgrade their technology as it advances.

1.2 Intended use description

The purpose of the WA-Trans Data Standards is to create a set of common requirements for the collection and exchange of information from a variety of spatial and tabular data sources (GIS, CAD, etc.) This information will create a statewide set of data layers developed as a comprehensive transportation network.

WA-Trans DRAFT Data Standards, 9-May-2005

2.0 Scope – Basic Overview of data types, mechanisms

The scope of the WA-Trans Data Standards identifies the modes of transportation data to be collected. It also includes the geographic extent, scale, datum, metadata, linear referencing, feature attributes, and data quality. Other relevant information can be found in the WA-Trans Data Model, Architecture and Processes documentation.

2.1 Definitions

| Term | Definition |
|----------------|--|
| SEGMENT (Line) | A segment is spatial data term meaning a line that has a start and an end point. The line between the points (nodes) can be straight or curved. |
| EVENT | An event is a geographic location, which may be a single specific point, or a portion of a finite distance along a line, which is located along a linear route relative to a fixed starting point. Event positions are measured/calculated from a defined point and depict occurrences along a line as measured from that defined starting point. Event types include address events, route events, x y events, and temporal events, all of which can be viewed in a GIS as if it were a part of the spatial data. |
| POINT | A point is a single object with a specific geographic location. Point data can be based on dynamic segmentation of roadways (using mileposts or distance from intersection), x, y coordinates from GPS, or geocoded addressing information. It is typically a zero-dimensional abstraction of an object that usually represents a geographic feature too small to be displayed as a line or area at that scale. |
| POLYGON | A polygon is a closed, two-dimensional figure with at least three sides that represents an area. It is used in GIS to describe spatial elements with a discrete area, such as parcels, political districts, homogeneous land use, and soil types. Polygon data layers will be used as a reference for clipping other data layers. |
| SEGMENT MODE | The mode of transportation associated with a particular line segment |
| FEATURE | A representation of a real-world object on a map. Features can be represented in a database (or a GIS) as vector data (points, lines, or polygons) or as cells in a raster data format. Features can also be a group of spatial elements that together represent a real-world entity. A complex feature is made up of more than one group of spatial elements: for example, a set of line elements with the common theme of roads representing a road network. |
| ENTITY | A collection of objects (persons, places, things) described by the same attributes. Entities in the case of WA-Trans are identified during the conceptual design phase of database and application design. |
| TOPOLOGY | The spatial relationships between connecting or adjacent coverage features (e.g., arcs, nodes, polygons, points and pixels). The geometric relationships are determined mathematically between connecting or adjacent features in a geographic data set. Topology may include information about connectivity, direction, length, adjacency, and polygon definition. Topology is what makes most types of geographic analysis in a GIS possible because it allows the analysis of spatial relationships between features. |
| ATTRIBUTE | Descriptive information or an inherent characteristic about a feature or entity. Typically used in a database to describe features or entities as they exist in the real world, and linked to other attributes and information through related tables by a unique identifier. |
| METADATA | Properties and documentation about the content, quality, condition, and other characteristics of data. Metadata for geographic data may document its subject matter; how, when, where, and by whom the data was collected; accuracy; availability, distribution information, projection, scale, resolution, accuracy, and its reliability with regard to some standard. Not to be confused with attribute data, which describes the feature in the real world (as noted above). |
| CONCATENATE | To join two or more character strings together, end to end, which creates one unique string. |
| CONFLATION | A set of procedures that aligns the features of two geographic data layers and then transfers the attributes of one to the other. |

WA-Trans DRAFT Data Standards, 9-May-2005

2.2 Symbols and Abbreviations

| Abbreviation | Description |
|-------------------|---|
| BLM | Bureau of Land Management |
| BLM GTN | BLM Ground Transportation (Roads & Trails) |
| BMS | <i>Bridge Management Systems</i> |
| CRAB | County Road Administration Board (Washington) |
| CRIS | County Road Information System (Washington) |
| CAD | Computer Aided Design |
| CADD | Computer Aided Design & Drafting |
| COG | <i>Council of Governments</i> |
| CSDGM | Content Standard for Digital Geospatial Metadata (Working subset metadata standard) |
| CTM | Cooperative Topographic Mapping (USGS) |
| DSA | <i>Data Sharing Agreement</i> |
| FGDC | Federal Geographic Data Committee |
| FMG | <i>Framework Management Group (WAGIC)</i> |
| FTRP | Framework Transportation segment Reference Point - PDF - "Specified location of a (required) endpoint of a Framework Transportation Segment (FTSeg), or an (optional) reference point offset along the length of the FTSeg, on a physical transportation system". NSDI Framework Transportation Identification Standard, page 27. |
| FTSeg | Framework Transportation Segment |
| GBF | Geographic Base File |
| GDT | Geographic Data Technology (Commercially available integrated roadway data) |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| IRICC | Interagency Resource Information Coordinating Council |
| ISB | Information Services Board (WSDoT Geographic Information Technology Subcommittee) |
| LLRS | Linear Location Reference System |
| LOS | Level of Service |
| LRS | Linear Reference System (PDF) |
| MPO | Metropolitan Planning Organization (e.g. COG, SRTC etc.) |
| MSAG | Master Street Address Guide (911 data) |
| NAD | North American Datum |
| NCHRP | National Cooperative Highway Research Program |
| NHS | National Highway System |
| NIMA | National Imagery and Mapping Agency (USGS) |
| NSDI | National Spatial Data Infrastructure |
| ODOT | Oregon State Department of Transportation |
| PMS | Pavement Management Systems |
| PSRC | Puget Sound Regional Council |
| REO | Regional Ecosystem Office |
| RRT | Related Route Type |
| SDTS | Spatial Data Transfer Standard |
| TIGER | Topologically Integrated Geographic Encoding and Referencing - US Census database with roads and ranges of street addresses |
| USFS | United States Forest Service |
| USGS | United States Geological Survey |
| USGS DLG | United States Geological Survey Digital Line Graph (USGS format digital vector representation of cartographic information) |
| USPS | United States Postal Service |
| WAGDA | Washington Geospatial Data Archive (U of W) |
| WAGIC | Washington State Geographic Information Council |
| (WA) DNR | (Washington State) Department of Natural Resources |
| WA-Trans/WA-TRANS | Washington Transportation Framework for GIS |
| WSDOT/WSDoT | Washington State Department of Transportation |
| WUTC | Washington Utilities and Transportation Commission |

WA-Trans DRAFT Data Standards, 9-May-2005

3.0 Data Characteristics

The following data characteristics outline included attribution for all transportation modes and attribution for specific transportation modes. These requirements are subject to change based on findings during the two pilot projects.

3.1 Required Attribution

3.1.1 Points (Roads)

| Segment Point | | <p>The specified location of the (required) points [From/To] of a Framework Transportation Segment (FTSeg), or an (optional) reference point offset along the length of the FTSeg, on a physical transportation system.</p> <p>The specified location of an endpoint of a Framework Transportation Segment (FTSeg), or a reference point offset along the length of the FTSeg, on a physical transportation system.</p> <p>A zero dimensional object that specifies geometric location. A pair (e.g., "x, y") or triplet (e.g., "x, y, z") of coordinates specifies the location (SDTS).</p> |
|------------------------------------|---------------|--|
| Segment Point Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point record within the database. |
| Segment Point Agreement Indicator | NCHAR(1) | Designates an agreement for location between jurisdictions |
| Segment Point Survey Description | NVARCHAR(255) | Narrative pertaining to the survey performed on the Segment Point. |
| Segment Point Object Code | NCHAR(1) | Object code indicating that a particular piece of data is a point. (FW-part of Trans. Point ID). |
| Segment Point Local Identifier | NVARCHAR(9) | Identifier assigned to Road Segment Point by Road Data Contributor (if applicable). |
| Segment Point Location Description | NVARCHAR(255) | An unambiguous description of the road segment point, which makes it field recoverable. (FW-Location Description). |
| Segment Point Northing | DECIMAL(10,3) | The distance northward of a point from a given parallel indicated by a map grid reference, calculated in US Survey Feet. |
| Segment Point Easting | DECIMAL(10,3) | The distance eastward of a point from a given meridian indicated by a map grid reference, calculated in US Survey Feet. |
| Segment Point Create Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was created. |
| Segment Point Update Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was updated. |
| Segment Point Validate Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was validated (verified). |
| Segment Point Retire Date | DATE | Date assigned to Road Segment Point that indicates the date that road segment point data was retired. |
| FIPS State Identifier | NVARCHAR(2) | Federal Information Processing Standard number identifying the State where data originated |
| FIPS County Identifier | NVARCHAR(3) | Federal Information Processing Standard number identifying the County where data originated |
| Segment Point Address | NVARCHAR(10) | Street Address |
| Segment Point Full Street Name | NVARCHAR(125) | Full Street Name |
| Segment Point Zip Code | NVARCHAR(10) | Associated Zip Code |
| FIPS Left City Identifier | NVARCHAR(5) | Federal Information Processing Standard number identifying the city to the left of the line segment |
| FIPS Right City Identifier | NVARCHAR(5) | Federal Information Processing Standard number identifying the city to the right of the line segment |
| Segment Point Agreement Identifier | INTEGER | Code that identifies a particular spatial data location agreement between two or more data providers |

WA-Trans DRAFT Data Standards, 9-May-2005

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| Segment Point Type Identifier | INTEGER | Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Type record within the database |
| Authority Segment Point Steward Identifier | INTEGER | Code that identifies a particular Data Steward |
| Authority Segment Point Data Maintainer Identifier | INTEGER | Code that identifies a particular Data Maintainer |
| Segment Status Identifier | INTEGER | Links to common identifiers in Segment Status, Segment Point, and Segment tables |
| Horizontal Accuracy Measurement Method Identifier | INTEGER | Contains an identifier that relates it to information about the quality of the data and how it was collected (e.g. survey quality, mapping quality, GPS collected data etc. |

| | | |
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| Segment Point Agreement | | An agreement between two parties, who possess overlapping data sets, and who share data boundaries, over the location of shared map features. |
| Segment Point Agreement Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Agreement record within the database. |
| Segment Point Agreement Document Description | NVARCHAR(255) | A record that describes the spatial agreement between entities of a feature |

3.1.2 Segment Data (Roads)

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| Segment Description Road | | Descriptive data pertaining to road segments. |
| Segment Description Road Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Description Road record within the database. |
| Segment Description Alternate Name Flag | BOOLEAN | Indicates if the Description record is an alternate, 'common' name as opposed to an official name given by the owner of the segment. |
| Segment Description Road Left Low Address | NVARCHAR(10) | Describes the left low address of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| Segment Description Road Left High Address | NVARCHAR(10) | Describes the left high address of a road segment as it relates to the Road Segment Description, assigned by the Road Data Steward. |
| Segment Description Road Left Zip Code | NVARCHAR(10) | Zip Code of address to the left of the line segment |
| Segment Description Road Right Low Address | NVARCHAR(10) | Describes the right low address of a road segment as it relates to the Road segment description, assigned by the Road Data Steward. |
| Segment Description Road Right High Address | NVARCHAR(10) | Describes the right high address of a road segment as it relates to the Road Segment Description, assigned by the Road Data Steward. |
| Segment Description Road Right Zip Code | NVARCHAR(10) | Zip Code of address to the right of the line segment |
| Segment Description Road Name Prefix Direction | NVARCHAR(10) | N, NW, S, SW, SE, E, NE |
| Segment Description Road Name Prefix Type | NVARCHAR(15) | Usually used to describe the road direction if it is incorporated into the road name (e.g. SW Main St) |
| Segment Description Road Name | NVARCHAR(50) | The name of the road |
| Segment Description Road Name Suffix Type | NVARCHAR(15) | Avenue, Street, Lane, Highway, Road etc |
| Segment Description Road Name Suffix Direction | NVARCHAR(10) | N, NW, S, SW, SE, E, NE (e.g. Main St. SW) |
| Segment Description Road Full Street Name | NVARCHAR(125) | The concatenation of the following fields in the order listed: Prefix Direction, Prefix Type, Road Name, Suffix Type, Suffix Direction |
| Segment Description Identifier | INTEGER | Foreign key to link to Segment Description table |

WA-Trans DRAFT Data Standards, 9-May-2005

| Segment Description | | Descriptive data pertaining to segments regardless of mode type. Specific descriptive data for each mode is handled in separate mode description tables. |
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| Segment Description Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Description record within the database. |
| Segment Description Local Identifier | NVARCHAR(15) | Identifier assigned to Transportation Segment Description by Mode Data Contributor (if applicable). Examples: County Road Number, City Street Name (Main St.), State Route Number (005) etc. |
| Segment Description Full LRS Description | NVARCHAR(25) | The unique identifier of the LRS that assures a distinction between segments that may have the same Local Identifier; e.g. Main St. This field is created by concatenating the following fields together: FIPS State Code (2 characters) <ul style="list-style-type: none"> AuthorityId (4 characters ONLY) ModelId (2 characters only) Local Identifier (15 characters) *SPECIAL NOTE: This schema requires /assumes the following: 1. The Authority specified WILL be the Owner of the physical infrastructure. 2. Leading zeros will be added to id fields not yet 4 characters long (e.g. 1 becomes 0001, etc.) 3. We will have no more than 3.1. 9999 Authorities; 3.2. 99 Modes The entire structure of this field will be modified if higher numbers are needed |
| Segment Description Path Description | NVARCHAR(255) | Description assigned to road segment by Road Authority that describes road segment circumstances. |
| Segment Description Create Date | DATE | Date assigned to Road Segment Description that indicates the road segment data creation date. |
| Segment Description Update Date | DATE | Date assigned to Road Segment Description that indicates the road segment data update date. |
| Segment Description Validate Date | DATE | Date assigned to Transportation Segment Description that indicates the segment data validation date. |
| Segment Description Retire Date | DATE | Date assigned to Road Segment Description that indicates the road segment data retirement date. |
| Segment Description Local Length | DECIMAL(9,2) | A measured length of a segment described by the Length Accuracy Measurement Method Code (FW-Length, T-FIT-Length). |
| Segment Description Begin Milepoint | DECIMAL(6,3) | Milepoint describing the beginning of a road segment as it relates to the Road segment description, assigned by the Road Data Contributor. |
| Segment Description End Milepoint | DECIMAL(6,3) | Milepoint describing the ending of a road segment as it relates to the Road segment description, assigned by the Road Data provider. |
| Length Accuracy Measurement Method Identifier | INTEGER | Link to either the horizontal or length accuracy measurement table - explains method of data capture |
| Segment Identifier | INTEGER | Unique identifier assigned to Road Segment within the database. Auto-generated field. |
| To Segment Point | INTEGER | Code that identifies the "TO" segment point of a given line segment |
| From Segment Point | INTEGER | Code that identifies the "FROM" segment point of a given line segment |
| Authority Segment Description Steward Identifier | INTEGER | Links to the Authority Identifier in the Authority table |
| Authority Segment Description Data Maintainer Identifier | INTEGER | Links to the Authority Identifier in the Authority table |
| Segment Status Identifier | INTEGER | Links to common identifiers in Segment Status, Segment Point, and Segment tables |

| Segment Status | | Contains data pertaining to the current operations state: operations, retired, proposed or closed roads |
|----------------------------|---------------|---|
| Segment Status Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Agreement record within the database. |
| Segment Status Code | NCHAR(1) | Code value indicating the nature of the transportation segment for use for the network. O-operational; R-retired; P-proposed; C-closed |
| Segment Status Description | NVARCHAR(100) | Description of the Single character Status Code. O-operational; R-retired; P-proposed; C-closed |

WA-Trans DRAFT Data Standards, 9-May-2005

| | | |
|-----------------------|---------------|---|
| Authority | | <p>Any organization that takes responsibility for proposing, designating or working in partnership with other organizations to build and maintain, or to make decisions about, the actual physical infrastructure, defining the FTRP and FTSeg, or the data being submitted to WA-Trans. The "authority" may be the owner of the physical infrastructure (PI), the maintainer of the PI, or the owner, provider, maintainer or contributor of the data being submitted to WA-Trans (all of which can differ from the PI owner). The term "Authority" therefore includes any organization that interacts with the WA-Trans System in any one of the following ways:</p> <p><u>Owner</u> - An entity or organization that owns the physical infrastructure recorded within the WA-Trans System, and makes decisions about its planning, design, construction or maintenance. The owner could also delegate planning, design, construction or maintenance responsibilities to a third party. In addition, the owner could be the entity that legally owns, and has legal authority and responsibility over, the data that is being submitted to WA-Trans (i.e. the one who has legal authority to make decisions regarding the data of which represents the physical infrastructure). In this case, the owner could also be the data steward. An example of an owner might be a larger entity such as a state government agency, county or municipal/city government.</p> <p><u>Infrastructure Maintainer</u> - The entity that has the responsibility to maintain any part of the physical infrastructure for which data is recorded in the WA-Trans System. This entity may be different than the owner. An example in this case may be a State Route that passes through a city and an agreement between WSDOT and the city stipulates that the city is responsible for maintaining that portion of the State Route. In this case, WSDOT is the owner, but the city is the PI Maintainer.</p> <p><u>Data Maintainer</u> - The entity that has the legal authority to make changes, edits, updates or alterations to the data that is provided to the WA-Trans system. This could be the same as the owner or steward, but it could also be a department, group, or individual(s) to which the owner or steward has delegated data editing/creation responsibilities. The data in question could be a portion of a data set that comprises of GPS collected line segments, points or a group of data, or an entire data set that the data steward is mandated to submit based on the signed DSA. This definition can be extended to an external third party working with, and on behalf of, the owner, steward, or user (e.g. a contractor or consultant). The data maintainer could also be the entity that is responsible for providing QA/QC to the data sets plus ensuring that the metadata are current, the specifics of which will be based on the negotiated data sharing agreements between WA-Trans and the entity that has ultimate authority over the data. In short, the data maintainer is the entity that works directly with the data and in all likelihood either is, or reports to, the data steward. The data maintainer will ultimately be the "contact" that will have the most detailed knowledge about the data, and information pertaining to the data maintainer will be tracked through the metadata submitted to WA-Trans. An example of a data maintainer might be a state, county or municipal/city government's department that handles geographic services.</p> <p><u>Data Steward</u> - The entity that has legal authority to provide data, or ensure that data is provided, to the WA-Trans system. If the data steward is the same as the owner they may also have the legal authority to make all decisions pertaining to the data. The data in question could be a portion of a data set that comprises of GPS collected line segments, points or a group of data, or an entire data set that the data steward is mandated to submit based on the signed DSA. The data steward may also be the entity that is responsible for providing QA/QC to the data sets plus ensuring that the metadata are current, or delegating this responsibility to a third party (i.e. the data maintainer). The specifics of these duties will be based on the negotiated data sharing agreements between WA-Trans and the entity that has ultimate authority over the data. An example of a data steward might be a government department or person who is responsible for managing that entity's geographic data, which must be the best available source.</p> <p><u>User</u> - An organization who does not participate in the defining of FTRP and FTSeg and does not contribute data to WA-Trans but who may wish to use the WA-Trans data.</p> |
| Authority Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify an Authority record within the database. |
| Authority Short Name | NVARCHAR(6) | The standard acronym used for the organization. Example: WSDOT is the short name for Washington State Department of Transportation. |
| Authority Name | NVARCHAR(60) | The actual name of the authority that has decision rights over particular data |
| Authority Description | NVARCHAR(300) | Describes who the Authority is, and what the Authority does |
| Authority Create Date | DATE | The date the authority record was entered into the database |
| Authority Active Flag | INTEGER | Indicates if the Authority is one that has current access to participate in WA-Trans. An example where an authority may become inactive is a City has un-incorporated and is no longer a legal entity. This field will track such entities in the database. |

WA-Trans DRAFT Data Standards, 9-May-2005

| Segment | | A specified directed path between two Framework Transportation Segment Reference Points along a physical transportation system that identifies a unique segment of that physical system. The NSDI Framework Transportation Identification Standards states that Segments must not span State or international borders. |
|---|--------------|---|
| Segment Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment record within the database. |
| Segment Local Identifier | NVARCHAR(9) | Identifier assigned to Road Segment by Road Data Contributor. |
| Segment Create Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was created. |
| Segment Update Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was updated. |
| Segment Validate Date | DATE | Date assigned to Road Segment that indicates when that road segment data was validated (verified). |
| Segment Retire Date | DATE | Date assigned to Road Segment that indicates the date that road segment data was retired. |
| Segment Object Code | NCHAR(1) | Object code indicating that a particular piece of data is a segment. (FW-part of Trans. Segment ID). |
| Segment Length | DECIMAL(9,2) | Road segment length number calculated at the WA-Trans database level. |
| Segment Geometry | LARGE BINARY | Road segment geometry cataloged by WA-Trans software, stored in a binary (BLOB) format that describes the road segment. |
| Horizontal Accuracy Measurement Method Identifier | INTEGER | Contains identifier that relates to table containing the horizontal accuracy and measurement method used to acquire a road segment point |
| FIPS State Identifier | NVARCHAR(2) | Federal Information Processing Standard number identifying the State where data originated |
| FIPS County Identifier | NVARCHAR(3) | Federal Information Processing Standard number identifying the County where data originated |
| FIPS Left City Identifier | NVARCHAR(5) | Federal Information Processing Standard number identifying the city to the left of the line segment |
| FIPS Right City Identifier | NVARCHAR(5) | Federal Information Processing Standard number identifying the city to the right of the line segment |
| Authority Owner Identifier | INTEGER | Code relating to the owner of the physical infrastructure and/or data |
| Authority Infrastructure Maintainer Identifier | INTEGER | Code relating to the entity responsible for maintaining the physical infrastructure |
| Authority Data Maintainer Identifier | INTEGER | Code relating to the entity responsible for maintaining the data that was submitted to WA-Trans |
| Authority Steward Identifier | INTEGER | Code relating to the entity that is the data steward |
| Segment Status Identifier | INTEGER | Links to common identifiers in Segment Status, Segment Point, and Segment tables |

| Segment Mode | | Defines the mode(s) that the segment supports; e.g. a multi-modal segment may be 'Road, Bike Lane, Light Rail', etc. |
|----------------------|---------|--|
| Segment Identifier | INTEGER | Unique identifier assigned to Road Segment within the database. Auto-generated field. |
| Mode Type Identifier | INTEGER | Unique code linking Segment Mode table to Mode Type table |

WA-Trans DRAFT Data Standards, 9-May-2005

| Mode Type | Mode type describes the nature of the segment in question. Examples include Automobile lane, bike lane, rail line, ferry route, etc. - Domain: | |
|----------------------|--|---|
| Mode Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Mode Type record within the database. |
| Mode Type Code | NVARCHAR() | Unique code linking Mode Type table to Segment Mode table |

| Surface Type | Contains information about the different categories of materials that may form the portion of the transportation mode. Examples include: asphalt, concrete, cinder, crushed gravel, etc. | |
|--------------------------|--|--|
| Surface Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Surface Type record within the database. |
| Surface Type Code | NCHAR(1) | Code identifying the type of surface to the Surface Type description |
| Surface Type Description | NVARCHAR(100) | Description of the Surface Type (e.g. paved, gravel, concrete, asphalt etc) |

| Structure Type | Contains information about the different categories of physical objects that may be located along a transportation mode. Examples include: Bridge, tunnel, etc. | |
|----------------------------|---|---|
| Structure Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Structure record within the database. |
| Structure Type Description | NVARCHAR(100) | Describes a structure found along the road route (e.g. bridge, tunnel, pedestrian overpass etc) |

| Segment Point Type | Defines the nature of a discrete geographic location. Possible values include: <ul style="list-style-type: none"> • Jurisdictional Boundaries • Transportation Terminal • Intersection (within a mode) • At-Grade Intersection (intersection of one mode with a different mode) | |
|--------------------------------|---|--|
| Segment Point Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Type record within the database. |
| Segment Point Type Code | NVARCHAR() | Code that identifies the type of segment point |
| Segment Point Type Description | NVARCHAR(100) | A description of the type of segment point (as noted above) |

3.1.3 Event Data

| Event Description | Event Federal Functional Class: | Contains data pertaining to the Federal functional class of the portion of the transportation mode from the specified start point to the specified end point. |
|------------------------------|---------------------------------|--|
| | Event Description: | Contains common data pertaining to events on a portion of the transportation mode from the specified begin point to the specified end point. |
| | Event Lanes: | Contains data pertaining to lanes of the portion of the transportation mode from the specified begin point to the specified end point. |
| | Event Speed Limit: | Contains data pertaining to the speed limit of the portion of the transportation mode from the specified begin point to the specified end point. |
| | Event Structure: | Contains data pertaining to the structure(s) inhabiting the portion of the transportation mode from the specified begin point to the specified end point. Examples may be a bridge, tunnel, etc. |
| | Event Surface: | Contains data pertaining to surface type of the portion of the transportation mode from the specified begin point to the specified end point. |
| Event Description Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify an Event Description record within the database. |

WA-Trans DRAFT Data Standards, 9-May-2005

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|--|---------------|--|
| Event Description Full LRS Description | NVARCHAR(25) | <p>The unique identifier of the LRS that assures a distinction between segments that may have the same Local Identifier; e.g. Main St.</p> <p>This field is created by concatenating the following fields together in the following way: FIPS State Code (2 characters)</p> <ul style="list-style-type: none"> • AuthorityId (4 characters ONLY) • ModelId (2 characters only) • Local Identifier (15 characters) <p>*SPECIAL NOTE: This schema requires /assumes the following:</p> <ol style="list-style-type: none"> 1. The Authority specified WILL be the Owner of the physical infrastructure. 2. Leading zeros will be added to any id field that is not yet 4 characters long (e.g. 1 becomes 0001, etc.) 3. We will have no more than 3.1. 9999 Authorities or 3.2. 99 Modes <p>If we ever need to have Id's higher than these, than the entire structure of this field will have to be modified.</p> |
| Event Description Begin Milepoint | DECIMAL(6,3) | Where an event begins along a route/line segment |
| Event Description End Milepoint | DECIMAL(6,3) | Where an event terminates along a route/line segment |
| Event Description Begin Address | NVARCHAR(10) | Begin address number that is coincident with the beginning position of the specific event; e.g. 809 |
| Event Description Begin Full Street Name | NVARCHAR(125) | Begin full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| Event Description Begin Zip Code | NVARCHAR(10) | Begin zip code that is coincident with the beginning position of the specific event; e.g. 98501 |
| Event Description End Address | NVARCHAR(10) | End address number that is coincident with the beginning position of the specific event; e.g. 1009 |
| Event Description End Full Street Name | NVARCHAR(125) | End full street name that is coincident with the beginning position of the specific event; e.g. Capital Blvd. SW |
| Event Description End Zip Code | NVARCHAR(10) | End zip code that is coincident with the beginning position of the specific event; e.g. 98504 |
| Event Description Begin FIPS Left City Identifier | NVARCHAR() | Based on segment direction, this describes the event at the beginning of the left of the City Identifier |
| Event Description End FIPS Left City Identifier | NVARCHAR(5) | Based on segment direction, this describes the event at the end of the left of the City Identifier |
| Event Description Begin FIPS Right City Identifier | NVARCHAR() | Based on segment direction, this describes the event at the beginning of the right of the City Identifier |
| Event Description End FIPS Right City Identifier | NVARCHAR(5) | Based on segment direction, this describes the event at the end of the right of the City Identifier |
| Event Description Create Date | DATE | The creation date of the data pertaining to the specified event. |
| Event Description Update Date | DATE | The date the data pertaining to the specified event was last updated. |
| Event Description Validate Date | DATE | The date that the event was validated (verified) in the database |
| Event Description Retire Date | DATE | The date that the event was retired from the database |
| Event Structure Local Code | NVARCHAR(25) | This is the data contributors local identifier of the particular structure from the begin point to the end point. |
| Event Speed Limit Maximum Legal Speed | INTEGER | The legally defined maximum velocity for the section of segment between the specified "begin milepoint" and "end milepoint". Example: 55 |
| Event Speed Limit Maximum Legal Speed Unit | NVARCHAR() | Defines the unit of measurement used for the speed limit. MPH - Miles per hour; KPH - Kilometers per hour |
| Event Federal Functional Class Code | NCHAR(1) | The code assigned to the Federal Functional Class |
| Event Federal Functional Class Road Number | INTEGER | A number assigned to a portion of a transportation mode (generally roads) by the Federal government |
| Event NonMotorized Width | NVARCHAR(25) | The linear distance on the NonMotorized section of the transportation mode, as measured in a direction perpendicular to the direction of travel. |

WA-Trans DRAFT Data Standards, 9-May-2005

| | | |
|--|---------------|---|
| Event NonMotorized Traffic Level | NVARCHAR() | A description of the level of non-motorized traffic using this segment |
| Event NonMotorized Dedicated Flag | BOOLEAN | Indicates whether the NonMotorized portion of the transportation mode restricts travel to ONLY NonMotorized traffic, or if it is a mixed mode transportation segment (i.e. any transportation mode may traverse section). 1 = Yes, Dedicated NonMotorized travel only; 0 = No, Mixed mode. |
| Event HOV Lane Occupant Requirement | INTEGER | The minimum number of occupants that are required to be in a vehicle for that vehicle to travel in the HOV lane during the designated HOV time period. |
| Event HOV Lane Time Restriction | INTEGER | The time periods for which the HOV lane is restricted to HOV use only. |
| Event HOV Lane Use Indicator | NVARCHAR(25) | Designates if the HOV Lane is a dedicated HOV lane at all times, or if other types of travel are permitted. |
| Event HOV Lane Activation Date | DATE | The calendar date the HOV lane began operating as an HOV lane. |
| Event Lanes Code | NCHAR(1) | A code depicting the type of lane depicted by a line segment |
| Event Lanes Count | INTEGER | The number of lanes in the section of segment from the specified "begin milepoint" to "end milepoint". |
| Structure Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Structure record within the database. |
| Event Structure Local Name | NVARCHAR(100) | The commonly used reference of the structure under consideration. |
| Surface Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Surface Type record within the database. |
| EventTypeIdIdentifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify an Event Type record within the database. |
| Authority Event Description Steward Identifier | INTEGER | An identifier that describes which entity has authority over this event data |
| Authority Event Description Data Maintainer Identifier | INTEGER | An identifier that describes which entity maintains the data |
| Authority Event Description Owner Identifier | INTEGER | An identifier that describes which entity owns the data |
| Mode Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Mode Type record within the database. |

| | | |
|------------------------|---------------|---|
| Event Type | | Designates the nature of the event; e.g. Speed Limit, Surface Type, Structure, etc |
| EventTypeIdIdentifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify an Event Type record within the database. |
| Event Type Name | NVARCHAR(25) | Change in segment description: i.e. a change in surface type, number of lanes, speed limit, type of lane (HOV), lane type (pedestrian/bicycle), classification etc. |
| Event Type Description | NVARCHAR(255) | Narrative explanation of the type of event |

| | | |
|---|---------------|---|
| Horizontal Accuracy Measurement Method | | Contains data pertaining to horizontal accuracy and measurement method of a road segment point |
| Horizontal Accuracy Measurement Method Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Horizontal Accuracy Measurement Method record within the database. |
| Horizontal Accuracy Measurement Method Code | NCHAR(3) | A three character code which describes the derivation of the horizontal position and which allows the user to assess the accuracy and precision of the point latitude and longitude. (FW-Horizontal-Accuracy-Measurement-Method). |
| Horizontal Accuracy Measurement Method Code Description | NVARCHAR(255) | Narrative description of the three character code, which describes the derivation of the horizontal position and which allows the user to assess the accuracy and precision of the point latitude and longitude. (FW-Horizontal-Accuracy-Measurement-Method). |

WA-Trans DRAFT Data Standards, 9-May-2005

| | | |
|--|---------------|--|
| Horizontal Accuracy Measurement Method Datum Description | NVARCHAR(255) | A description of the datum that was being used during the capture and creation of the original data |
| Horizontal Accuracy Measurement Method Project Description | NVARCHAR(255) | A description of the projection that was being used during the capture and creation of the original data |

| Length Accuracy Measurement Method | | Contains data pertaining to length accuracy and measurement method of a road segment point |
|---|--------------|--|
| Length Accuracy Measurement Method Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Length Accuracy Measurement Method record within the database. |
| Length Accuracy Measurement Method Code | NCHAR(3) | A 3-letter code assigned to the method of data capture |
| Length Accuracy Measurement Method Code Description | NVARCHAR(50) | The methods used to acquire the data that is submitted by a data provider (as per the method code) |

3.1.4 Other Transportation Modes

3.1.5 Non-motorized

| Segment Description Non-Motorized | | Descriptions of NonMotorized transportation modes; e.g. Bike Paths, Pedestrian ways, etc. |
|--|--------------|---|
| MODEFLAG | INTEGER | Code depicting mode type |
| WIDTH | Decimal(3,3) | Of segment (road) |
| PAVEMENTTYPE | INTEGER | Pavement type assigned by RDOWNER/SUBMITTER? |
| Authority Event Description Owner Identifier | INTEGER | Entity responsible for maintenance of segment |

3.1.6 Railroad

| Segment Point Rail | | Descriptive data pertaining to discrete locations along rail lines (examples include rail stations and rail crossing information) |
|---|---------------|--|
| Segment Point Rail Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Rail record within the database. |
| Segment Point Rail Station Name | NVARCHAR(100) | The name of the rail station |
| Segment Description Rail Crossing Code | NVARCHAR() | Type of crossing - over, under, at grade, pedestrian |
| Segment Description Rail Warning Device | INTEGER | Code identifying whether there is sign, or lights or other types of devices. From the Federal Railway Administration Data |
| Segment Point Identifier | INTEGER | Unique identifier linking Segment Point Rail table to Segment Point table |

| Segment Description Rail | | Descriptive data pertaining to rail segments (examples include the name of the rail like, operator name, track class, etc) |
|---|--------------|--|
| Segment Description Rail Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Description Rail record within the database. |
| Segment Description Rail Name | NVARCHAR() | The Name the "line" or railroad company |
| Segment Description Rail Operator | NVARCHAR() | Description of the owner or operator of the line. |
| Segment Description Rail WUTC Line Identifier | NVARCHAR(10) | A code for railroad segments based upon the WA Utilities and Transportation Commission. |

WA-Trans DRAFT Data Standards, 9-May-2005

| | | |
|---|--------------|--|
| Segment Description Rail From Station | NVARCHAR(20) | Name of origination station, generally a city or town name. Goes with WUTC Line Identifier. |
| Segment Description Rail To Station | NVARCHAR(20) | Name of destination station, generally a city or town name. Goes with WUTC Line Identifier. |
| Segment Description Rail USDOT Number | NVARCHAR() | A code for all railroad crossings. |
| Segment Description Rail Public Flag | BOOLEAN | Indicates if Railroad feature part of public railroad line? 1 = Yes; 0 = No |
| Segment Description Rail Track Class | INTEGER | Federal designator that indicates various things such as maximum speed allowed. Can be values 0 - 6 |
| Segment Description Rail Passenger Train Flag | BOOLEAN | Identifies if a regularly scheduled passenger train uses the line. |
| Segment Description Rail Track Count | INTEGER | The number of tracks within the rail segment. Applies both to rail lines and crossings. |
| Segment Description Rail Type | NVARCHAR() | Describes the nature of rail segment. This could be part of the mode code. Possible values include: siding, mainline, industrial spur |
| Segment Description Identifier | INTEGER | Unique identifier that links the Segment Description Rail table to the Segment Description table |

3.1.7 Aviation

| | | |
|--|---------|---|
| Segment Description Airport | | Descriptive data pertaining to airport segments (e.g. runways) |
| Segment Description Airport Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Description Airport record within the database. |

| | | |
|---------------------------------|--------------|---|
| Segment Point Airport | | Contains data pertaining to Airport features of the transportation mode at the specified end point. Airport(s) -- an area of land or water that is used or intended to be used for the landing and takeoff of aircraft and includes its buildings and facilities, if any. For the purpose of these instructions, the term "airport(s)" includes airports, heliports, seaplane bases, stolports (short takeoff and landing airports), gliderports, ultralight flightparks, and balloonports except where a distinction is made in the text. - From: http://www.faa.gov/ARP/publications/acs/5200-35.pdf |
| Segment Point AirportIdentifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Airport record within the database. |
| Segment Point Identifier | INTEGER | Unique identifier linking Segment Point Airport table to Segment Point table |
| Airport Identifier | NVARCHAR(4) | 4-character code that identifies airports |
| Instrument Approach | BOOLEAN | Airport is either equipped, or not equipped, to handle an instrument approach |
| ARC Code | NVARCHAR(4) | Size, weight, speed and length of wings from tip to tip; (can be used to determine maximum size of aviation vehicle that can utilize airport.) |
| Surface Width | DECIMAL(4) | Typically the width of the runway, or a paved area that is used by aircraft |
| Elevation | DECIMAL(6,1) | The vertical distance above or below a reference ellipsoid. For WSDOT this reference ellipsoid is designated WGS84. |
| ElevationUnit | NVARCHAR(10) | The system of measurement used for the Elevation of the airfield; e.g. feet or meters. |
| FAA Classification | NVARCHAR(30) | Federal Aviation Administration Classification. One of the five basic airport service levels which describe the type of service that the airport is expected to provide to the community at the end of the 5-year planning period. The service levels also represent funding categories for the distribution of Federal aid. PR Commercial Service - Primary |

WA-Trans DRAFT Data Standards, 9-May-2005

| | | |
|----------------------|---------------|--|
| | | CM Commercial Service - Nonprimary CR Commercial Service Airport that also serves as a reliever (included with CM in statistical summaries) - RL Reliever Airport; GA General Aviation Airport |
| State Classification | NVARCHAR(10) | Type of airport (e.g. cargo, transport, general etc) |
| Airport Name | NVARCHAR(100) | The actual name of the airport (e.g. Sea-Tac) |
| ControlFlag | BOOLEAN | Indicates if an Airport is controlled (i.e. has a tower) or not. 1 = Controlled (yes); 0 = Uncontrolled (no) |
| AWAS Flag | BOOLEAN | Automated Weather Advisory System. Bit flag indicating if the airport on record has this system or not. 1 = Yes; 0 = No |
| Owner | NVARCHAR(30) | The actual owner of the airport (i.e. private owner, state, county etc) |
| Terminal Flag | BOOLEAN | Bit flag, which indicates whether or not the airport on record has a terminal or not. 1 = Yes; 0 = No |
| AirportUse | NVARCHAR() | PU = Public use. A public use airport is an airport available for use by the general public without a requirement for prior approval of the owner or operator. The owners of public use airports cannot impose operational restrictions on the use of the airport. Restrictions such as prior permission required or use at your own risk or contact the airport manager prior to landing are not permissible at public use airports. PR = Private use. A private use airport is one available for use by the owner only or by the owner and other persons authorized by the owner only. The owners of private use airports do not have to reiterate in a remark in data element 110 that the airport is private use or that prior permission is required. |

| | | |
|------------------------------------|-------------|---|
| Segment Point Mode Order | | Indicates the order of the segment point for a particular mode. A segment point may have different importance to different modes. Defines the nature of the point of record: 1st order - a point where a segment is broken; e.g. begin/end 2nd order - point not at the break of a segment, but where there is facility information, specifically public/private road at-grade intersections. *Note: The same segment point can be a different 'order' for different modes. An example is where a bike lane joins a road segment. The point it joins is a first order point for the bike lane as it is the end point for the segment, but for the road, it is a second order point to indicate it is a point of interest, but not a break in the segment. |
| Segment Point Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point record within the database. |
| Mode Type Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Mode Type record within the database. |
| Segment Point Mode Order Indicator | NVARCHAR(5) | Defines the nature of the point of record: 1st order - a point where a segment is broken; e.g. begin/end 2nd order - point not at the break of a segment, but where there is facility information, specifically public/private road at-grade intersections. Perhaps we can define additional 'orders' for road/rail at-grade intersections, etc. *Note: The same segment point can be a different 'order' for different modes. An example is where a bike lane joins a road segment. The point it joins is a first order point for the bike lane as it is the end point for the segment, but for the road, it is a second order point to indicate it is a point of interest, but not a break in the segment. |

3.1.8 Ferries

| | | |
|--------------------------------|--------------|---|
| Segment Point Ferry | | Descriptive data pertaining to ferry terminals |
| Segment Point Ferry Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Point Ferry record within the database. |
| Segment Point Ferry Name | NVARCHAR(50) | The name of the ferry terminal |
| Segment Point Identifier | INTEGER | Unique identifier linking Segment Point Ferry table to Segment Point table |

WA-Trans DRAFT Data Standards, 9-May-2005

| Segment Description Ferry | | Contains data pertaining to Ferry features of the transportation mode at the specified terminal. Special condition of a segment description? |
|---|--------------|---|
| Segment Description Ferry Identifier | INTEGER | Surrogate Key. Sequential number auto-generated by the database upon insertion of a record. Used to uniquely identify a Segment Description Ferry record within the database. |
| Segment Description Ferry Hours Not Available | NVARCHAR(30) | Hours of available ferry service |
| Segment Description Ferry System-Wide Restrictions | NVARCHAR(30) | Descriptions of restrictions per ferry (e.g. Smoking, parking, hazardous goods etc.) |
| Segment Description Ferry Route Load Restrictions | NVARCHAR(30) | Ferry vehicle weight and height and width restrictions |
| Segment Description Ferry Route Length Restrictions | NVARCHAR(30) | Ferry vehicle length restrictions |
| Segment Description Ferry Route Crossing Time | DECIMAL(3,0) | The time it takes the ferry to travel the designated ferry route |
| Segment Description Identifier | INTEGER | Unique identifier that links the Segment Description Ferry table to the Segment Description table |

4.0 Data Standards

4.1 Spatial Data Rules

- 1) Within a given mode, segments will be broken at public, at-grade intersections and at jurisdictional boundaries.
 - To facilitate accurate address geocoding, at-grade, non-road crossings with roadways will be identified with '2nd Order Points.' 2nd order points may also be used to identify public/private at-grade road intersections. 2nd Order Points identify special types of intersections that are important to document but will not be used to break the roadway segment. Use of 2nd order points avoids over-segmentation of roadway segments, while allowing the possibility for entities to define agreement points at such intersections. Such a point can stand-alone and provides a means to clip a roadway segment, if needed, for a geometric network.
 - Modes that share the roadbed - for instance a bike lane along a roadway - will be treated as a roadway event for the shared extent.
- 2) Roadways and railroads will always have a separate geometry (a segment Mode table can never contain information about a contiguous rail and road element). Unique segment ID methodology as per FGDC standards will be utilized
- 3) Unique segment ID methodology as per FGDC standards will be utilized.
- 4) Segments will be broken at jurisdiction boundaries (city, county, state boundaries).
- 5) A split of an existing segment will result in retirement of the original Segment ID and assignment of two new Segment IDs.
- 6) Any segment or segment point geometry edits, joins, or splits force an update of all associated events tables
- 7) Segment Point IDs will not change. If the location of a segment point changes, the ID is retired and a new ID is assigned (facilitating their use as multi-modal transfer stations).
- 8) Linear features must match at jurisdictional boundaries, which will be achieved through agreement points.
- 9) Time/Date stamping shall be used to ensure proper records management, and adequate metadata. This will be handled by the database – WA-Trans submission date.
- 10) FGDC compliant metadata shall be maintained for all datasets.

WA-Trans DRAFT Data Standards, 9-May-2005

- 11) Multi-modal line segments will be accommodated with the use of multiple line segments with coincident geography (i.e. stacked arcs along a congruent segment). Modes that share the roadbed - for instance a bike lane along a roadway - will be treated as a roadway event for the shared extent.
- 12) Database fields that are submitted with blank names and unnamed roads will be handled by the translator through nulls, empty strings, and blank spaces.
- 13) Segmentation Rules – segments will comprise of two nodes and one line.
- 14) Spatial Accuracy will be handled by domain and metadata.
- 15) State routes, county routes, and city routes – All to be defined within their respective records
- 16) State Route (SR), Related Roadway Type (RRT) and Related Roadway Qualifier (RRQ) will be used to identify Ramps and Spurs. Such roadway features will be identified with a three character State Route Number (with leading zeroes) plus the two-character code for the Related Roadway Type and the 6 character Related Roadway Qualifier (see Appendix-A for a more detailed description)

4.2 Rules for submission – See processed QA/QC

- Best available datasets must be topologically clean when in GIS format
- Line features should be contiguous across coverage boundaries (i.e. where a single geographic feature is split into adjacent coverages or tiles, it should be edge-matched).
- Every feature (point, line, etc) should have one attribute record.
- Each layer of submitted data needs to have complete attributes as designated by the required attribution section (3.1) above.
- Must only submit data of which you are the legal “data steward” as defined by the WA-Trans Standards documentation. This will be as determined by the Data Sharing Agreement signed between WA-Trans and the organization/entity that has legal authority and responsibility over the data that is being submitted to WA-Trans.
- All data will have metadata that will need to be with data submission.
- Any authority providing Event data MUST also provide their Segment Description data for all appropriate Segments within the event.

5.0 Metadata Standards

Introduction

There are many approaches for documenting geographic data for archival purposes and day-to day use. Some methods range from informal “read me” files discussing spatial reference information, lineage, and process steps to full FGDC metadata with every field being required and populated. WAGIC established metadata standards for “significant geo-datasets” as defined in the Geographic Information Technology Standards for Metadata. This requires the collection and posting of metadata in a specific approved format for an existing or proposed “significant geo-dataset” before December 30, 2004.

Approved language

It is the policy of WA-TRANS that the completed framework dataset will include metadata that meets the requirements of the Working Subset Metadata Standard of FGDC/CSDGM. There will be fields, such as depth system definition, depth datum name, and raster object information that will not apply to the WA-TRANS, and they will be coded as “N/A” in the completed metadata document. The original metadata schema itself will not be modified to remove these fields.

WA-Trans DRAFT Data Standards, 9-May-2005

Background materials

- Geographic Information Technology Standards for Metadata
- WAGIC Basic Metadata Standard
- Working Subset Metadata Standard of FGDC/CSDGM

Intent

- Geographic data must be properly documented for it to be stored and retrieved without a loss of information.
- WA-TRANS is a very significant geo-dataset that requires proper and as complete documentation as possible.

Definitions:

- **Metadata** - "data about data" or "information describing content."
- **WAGIC** - Washington State Geographic Information Council
- **FGDC** - Federal Geographic Data Committee

Detailed research for proposed language:

I. [Geographic Information Technology Standards for Metadata](#)

"To facilitate implementation of this standard the WAGIC Basic and Working subsets of the FGDC Content Standard for Digital Geospatial Metadata are recognized as an approved implementation pathway."

II. [WAGIC Basic Metadata Standard](#)

This is the minimum required documentation to meet the Geographic Information Technology Standard for metadata before December 30, 2004.

III. [Working Subset Metadata Standard](#) of FGDC / CSDGM.

The Working Subset includes a Basic Subset plus following shaded elements. This is the minimum required documentation to meet the Geographic Information Technology Standard for metadata after 30 Dec, 2004.

5.1 WAGIC Basic Metadata Standard

Element Title

Element Purpose

Minimum Requirements

| ISB / WAGIC - Basic Metadata Subset From FGDC Content Standard for Digital Geospatial Metadata <i>Basic Subset - shaded areas identify actual data entry elements</i> | | | | |
|--|--|--|----------------|---------------|
| | Element Name | Element Definition | FGDC Hierarchy | sgml tag name |
| | Identification Information | Basic information about the data set. | 1 | idinfo |
| 1 | Title | The name by which the data set is known | 8.4 | title |
| 2 | Publisher | Name of individual or organization that published the data set | 8.8.2 | publish |
| | Description | A characterization of the data set, including its intended use and limitations. | 1.2 | descript |
| 3 | Abstract | A brief narrative summary of the data set. Domain: free text. | 1.2.1 | abstract |
| 4 | Purpose | A summary of the intentions with which the data set was developed. Domain: free text | 1.2.2 | purpose |
| | Time Period of Content | Time period(s) for which the data set corresponds to the ground. | 1.3 | timeperd |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 5 | Beginning Date | The first year (and optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 6 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| 7 | Currentness Reference | The basis on which the time period of content is determined. Domain: "Ground Condition" "Publication Date" free text | 1.3.1 | current |
| | Keywords | Words or phrases summarizing an aspect of the data set. | 1.6 | keywords |
| | Theme | Subjects covered by the data set | 1.6.1 | theme |
| 8 | Theme Keyword | Common-use word or phrase used to describe the subject of the data set. Domain: free text | 1.6.1.2 | themekey |
| | Place | Geographic locations characterized by the data set. | 1.6.2 | place |
| 9 | Place Keyword | The geographic name of a location covered by a data set. Domain: free text | 1.6.2.2 | placekey |
| | Data Quality Information | A general assessment of the quality of the data set. | 2 | dataqual |
| | Lineage | Information about the events, parameters, and source data, which constructed the data set, and information about the responsible parties. | 2.5 | lineage |
| 10 | Source Information | List of sources and short discussion of the information contributed by each. | 2.5.1 | srcinfo |
| 11 | Source Time Period of Content | Time period(s) for which the source data set corresponds to the ground. Information about the date and time of an event. | 2.5.1.4 | srcstime |
| | Range of Dates / Times | Means of encoding a range of dates and times. | 9.3 | rngdates |
| 12 | Beginning Date | The first year (an optionally month, or month and day) of the event. Domain: "Unknown" free date | 9.3.1 | begdate |
| 13 | Ending Date | The last year (and optionally month, or month and day) for the event. Domain: "Unknown" "Present" free date | 9.3.3 | enddate |
| | Entity and Attribute Information | Information about the content of the data set, including the entities types, their attributes, and the domains from which attribute values may be assigned. | 5 | eainfo |
| 14 | Overview Description | Summary of, and citation to detailed description of, the information content of the data set. | 5.2 | overview |
| 15 | Entity/Attribute Overview | Detailed Summary of the information contained in a data set. Domain: free text | 5.2.1 | eaover |
| | Point of Contact / Contact Information | Contact information for an individual or organization that is knowledgeable about the data set. Identity of, and means to communicate with, person(s) and organization(s) associated with the dataset. | 10 | ptcontac |
| 16 | Contact Person | The name of the individual to which the contact type applies. Domain: free text | 10.1.1 | cntper |
| 17 | Contact Organization | The name of the organization to which the contact type applies. Domain: free text | 10.1.2 | cntorg |
| 18 | Contact Position | The title of the individual. Domain: free text | 10.3 | cntpos |
| 19 | Contact Address | The address for the organization or individual. | 10.4 | cntaddr |
| 20 | Address Type | The information provided by the address. Domain: "Mailing Address" "Physical Address" "Mailing and Physical Address" | 10.4.1 | addrtype |
| 21 | Address | An address line for the address. Domain: free text | 10.4.2 | address |
| 22 | City | The city of the address. Domain: free text | 10.4.3 | city |
| 23 | State or Province | The state or province of the address. Domain: free text | 10.4.4 | state |
| 24 | Postal Code | The ZIP or other postal code of the address. Domain: free text | 10.4.5 | postal |
| 25 | Contact Voice Telephone | The telephone number by which individuals can speak to the organization or the individual. Domain: free text | 10.5 | cntvoice |
| 26 | Contact FAX Telephone | The telephone number of a FAX machine of the organization or individual. Domain: free text | 10.7 | cntfax |
| 27 | Contact E-Mail Address | The address of the electronic mailbox of the organization or individual. Domain: free text | 10.8 | cntemail |

5.2 Working Subset Metadata Standard

Information Service Board Metadata Standard – Appendix A
Approved Working Level Subset of FGDC/CSDGM
(February 6th 2003)

| Element Title | | Element Purpose | Minimum Requirements |
|--|---|-----------------|----------------------|
| Working Subset includes Basic Subset plus following shaded elements | | | |
| Element Name | Element Definition | FGDC Hierarchy | |
| Status | The state and maintenance of information for the data set. | 1.4 | |
| Progress | The state of the data set. Domain: "Complete" "In Work" "Planned" | 1.4.1 | |
| Maintenance and Update Frequency | The frequency with which changes and additions are made to the data set after the initial data set is completed. Domain: "Continually" "Daily" "Weekly" "Monthly" "Annually" "Unknown" "As Needed" "Irregular" "None Planned" free text | 1.4.2 | |
| Spatial Domain | The geographic areal domain of the data set. | 1.5 | |
| Bounding Coordinates | The limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate | 1.5.1 | |
| West Bounding Coordinate | Western-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= West Bounding Coordinate < 180.0 | 1.5.1.1 | |
| East Bounding Coordinate | Eastern-most coordinate of the limit of coverage expressed in longitude. Domain: -180.0 <= East Bounding Coordinate < 180.0 | 1.5.1.2 | |
| North Bounding Coordinate | Northern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= North Bounding Coordinate <= 90.0; North Bounding Coordinate >= South Bounding Coordinate | 1.5.1.3 | |
| South Bounding Coordinate | Southern-most coordinate of the limit of coverage expressed in latitude. Domain: -90.0 <= South Bounding Coordinate <= 90.0; South Bounding Coordinate <= North Bounding Coordinate | 1.5.1.4 | |
| Theme Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of theme keywords. Domain: "None" free text | 1.6.1.1 | |
| Place Keyword Thesaurus | Reference to a formally registered thesaurus or a similar authoritative source of place keywords. Domain: "None" "Geographic Names Information System" free text | 1.6.2.1 | |
| Access Constraints | Restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data. Domain: "None" | 1.7 | |
| Use Constraints | Restrictions and legal prerequisites for using the data set after access is granted. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data | 1.8 | |
| Attribute Accuracy | An assessment of the accuracy of the identification of entities and assignment of attribute values in a data set. | 2.1 | |
| Attribute Accuracy Report | An explanation of the accuracy of the identification of the entities and assignments of values in the data set and a description of the texts used. Domain: free text | 2.1.1 | |
| Positional Accuracy | An assessment of the accuracy of the positions of spatial objects. | 2.4 | |
| Horizontal Positional Accuracy | An estimate of accuracy of the horizontal positions of the spatial objects. | 2.4.1 | |
| Horizontal Positional Accuracy Report | An explanation of the accuracy of the horizontal coordinate measurements and a description of the tests used. Domain: free text | 2.4.1.1 | |
| Vertical Positional Accuracy | An estimate of accuracy of the vertical positions in the data set. | 2.4.2 | |
| Vertical Positional Accuracy Report | An explanation of the accuracy of the vertical coordinate measurements and a description of the tests used. Domain: free text | 2.4.2.1 | |
| Source Scale Denominator | The denominator of the representative fraction on a map (for example, on a 1:24,000-scale map, the Source Scale Denominator is 24,000. Domain: Source Scale Denominator > 1 | 2.5.1.2 | |
| Source Contribution | Brief explanation identifying the information contributed by the source to the data set. Domain: free text | 2.5.1.6 | |
| Spatial Data Organization Information | The mechanism used to represent spatial information in the data set. | 3 | |
| Direct Spatial Reference Method | The system of objects used to represent space in the data set. Domain: "Point" "Vector" "Raster" | 3.2 | |
| Raster Object Information | The types and numbers of raster spatial objects in the data set. | 3.4 – N/A | |
| Raster Object Type | Raster spatial objects used to locate zero-, one-, and two-, and three-dimensional locations in the data set. Domain: "Point" "Pixel" "Grid Cell" "Voxel" | N/A - 3.4.1 | |
| Spatial Reference Information | The description of the reference frame for, and the means to encode, coordinates in the data set. | 4 | |
| Horizontal Coordinate System Definition | The reference frame or system from which linear or angular quantities are measured and assigned to the position that a point occupies. | 4.1 | |
| Planar | The quantities of distances or, or distances and angles, which define the position of a point on a reference plane to which the surface of the Earth has been projected. | 4.1.2 | |

WA-Trans DRAFT Data Standards, 9-May-2005

| Working Subset includes Basic Subset plus following shaded elements - continued | | | |
|--|---------------------------------------|--|-----------------------|
| | Element Name | Element Definition | FGDC Hierarchy |
| | Grid Coordinate System | A plane-rectangular coordinate system usually based on, and mathematically adjusted to, a map projection so that geographic positions can be readily transformed to and from plane coordinates. | 4.1.2.2 |
| | Grid Coordinate System Name | Name of the grid coordinate system. Domain: A code table | 4.1.2.2.1 |
| | State Plane Coordinate System (SPSC) | A plane-rectangular coordinate system established for each state in the United States by the National Geodetic Survey. | 4.1.2.2.4 |
| | SPCS Zone Identifier | Identifier for the SPCS zone. Domain: Four-digit numeric code for the State Plane Coordinate Systems based on the North American Datum of 1983 are found in Department of Commerce, 1986, Representation of geographic point locations for information interchange | 4.1.2.2.4.1 |
| | Planar Coordinate Information | Information about coordinate system | 4.1.2.4 |
| | Planar Distance Units | Units of measure used for distance | 4.1.2.4.4 |
| | Geodetic Model | Parameters for the shape of the Earth. | 4.1.4 |
| | Horizontal Datum Name | The identification given to the reference system used for defining the coordinates of points. Domain: "North American Datum of 1927" "North American Datum of 1983" free text | 4.1.4.1 |
| | Ellipsoid Name | Identification given to established representations of the Earth's shape. | 4.1.4.2 |
| | Semi-major Axis | Radius of the equatorial axis of the ellipsoid | 4.1.4.3 |
| | Denominator of Flattening Ratio | The denominator of the ratio of the difference between the equatorial and polar radii of the ellipsoid when numerator is set to 1. | 4.1.4.4 |
| | Vertical Coordinate System Definition | The reference frame or system from which vertical distances (altitudes or depths) are measured | 4.2 |
| | Altitude System Definition | The reference frame or system from which altitudes (elevations) are measured. The term "altitude" is used instead of the common term "elevation" to conform to the terminology in Federal Information Processing Standards 70-1 and 173 | 4.2.1 |
| | Altitude Datum Name | The identification given to the surface taken as the surface of the reference frame from which altitude is measured | 4.2.1.1 |
| | Depth System Definition | The reference frame of system from which depths are measured | 4.2.2 – N/A |
| | Depth Datum Name | The identification given to surface of reference from which depths are measured | N/A - 4.2.2.1 |
| | Detailed Description | Description of the entities, attributes, attribute values, and related characteristics encoded in the data set. | 5.1 |
| | Entity Type | The definition and description of a set into which similar entity instances are classified. | 5.1.1 |
| | Entity Type Label | The name of the entity type. Domain: free text | 5.1.1.1 |
| | Entity Type Definition | The name of the entity type. Domain: free text | 5.1.1.2 |
| | Attribute | A define characteristic of an entity. | 5.1.2 |
| | Attribute Label | The name of the attribute. Domain: free text | 5.1.2.1 |
| | Attribute Definition | The description of the attribute. Domain: free text | 5.1.2.2 |
| | Attribute Domain Value | The valid values that can be assigned for an attribute. | 5.1.2.4 |
| | Enumerated Domain | The members of an established set of valid values. | 5.1.2.4.1 |
| | Enumerated Domain Value | The name or label of a member of the set. Domain: free text | 5.1.2.4.1.1 |
| | Enumerated Domain Value Definition | The description of the value. Domain: free text | 5.1.2.4.1.2 |
| | Range Domain | The minimum and maximum values of a continuum of valid values. | 5.1.2.4.2 |
| | Range Domain Minimum | The least value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.1 |
| | Range Domain Maximum | The greatest value that the attribute can be assigned. Domain: free text | 5.1.2.4.2.2 |
| | Codeset Domain | Reference to a standard or list which contains the members of an established set of valid values. | 5.1.2.4.3 |
| | Codeset Name | The title of the codeset. Domain: free text | 5.1.2.4.3.1 |
| | Codeset Source | The authority for the codeset. Domain: free text | 5.1.2.4.3.2 |
| | Attribute Units of Measurement | The standard of measurement for an attribute value. Domain: free text | 5.1.2.5 |
| | Attribute Measurement Resolution | The smallest unit increment to which an attribute value is measured. Domain: Attribute Measurement Resolution > 0.0 | 5.1.2.6 |
| | Citation Information | The recommended reference to be used for the data set. | 8 |
| | Originator | The name of organization or individual that developed data set. | 8.1 |
| | Publication Date | Date dataset published | 8.2 |
| | Title | The recommended name of dataset | 8.4 |

6.0 Data Quality

6.1 Quality Assurance and Quality Control (Phase II)

Quality assurance and quality control (QA/QC) are the processes and tools, which establish and enforce data consistency and data accuracy. In an environment where data is being integrated from multiple sources, it is a critical function. Software can be built to enforce QA/QC in the following categories:

- Topological – checks regarding connectivity of the line work at intersections, overpasses and bridges represented as separate features, arcs meeting at jurisdictional boundaries, etc.
- Scale/Spatial – Does the location accuracy meet the planned business use of the data, does the “aesthetic” representation of the transportation feature meet the business requirements?
- Attribute – Are the minimum required fields included, are the field descriptions met, how many of the attributes are populated, are the attribute values valid?
- Metadata – Concerns regarding metadata include: has the required metadata been provided, is it complete, and does it conform to established metadata standards; does the metadata match the layer?

All of these are standard GIS requirements for checking data and when the environment is one of handling data from a variety of sources, it is critical that they be supported with software tools to facilitate efficient checking and validation.

6.2 Data Scale (Expressed targets)

| This will be a multi-scale dataset | | | |
|------------------------------------|----------|----------|-----------|
| Urban | 1:1,200 | 1:6,000 | 1:24,000 |
| Rural | 1:6,000 | 1:24,000 | 1:48,000 |
| Remote | 1:24,000 | 1:48,000 | 1:100,000 |

6.3 Data Accuracy (Expressed targets)

| | Urban | | | Rural | | | Remote (Agriculture / Forestry) | | |
|------------------------|---------|----------|--------|---------|---------|---------|---------------------------------|---------|---------|
| | High | Medium | Low | High | Medium | Low | High | Medium | Low |
| Spatial Accuracy | 1 ft. | 5 ft. | 40 ft | 5 ft | 40 ft | 50 ft | 40 ft. | 50 ft. | 100 ft. |
| Update Frequency | 1 month | 6 months | 1 year | 1 year | 2 years | 3 years | 1 year | 2 years | 5 years |
| Attribute Completeness | 95% | 80% | 70% | 95% | 80% | 70% | N/A | N/A | N/A |
| Source Scale | 1:1,200 | 1:6,000 | 1:24 K | 1:6,000 | 1:24 K | 1:48 K | 1:24 K | 1:48 k | 1:100 K |

6.4 Coordinate System Standards

In support of the above objectives Washington State adopts the following technical standards related to Datum and Coordinate Systems for significant geo-datasets. This standard is intended to apply to existing and new 'significant' agency geo-datasets

Datum:

North American Datum 1983 (1991 adjustment) as defined by the National Geodetic Survey. (Also referred to as: NAD83/91)

Coordinate System:

The standard coordinate system shall be the Washington Coordinate System of 1983 alternately; the Geographic Coordinate System may be used.

Washington Coordinate System of 1983

- The system of plane coordinates established by the National Geodetic Survey for defining and stating the positions or locations of points on the surface of the earth within the state of Washington is referred to as the Washington Coordinate System of 1983.
- The coordinate system standard for significant geo-dataset is Washington Coordinate System of 1983 (WCS 83) zone appropriate for geo-datasets that are maintained within the WCS 83 North zone or, WCS 83 South zone.
- The standard is Washington Coordinate System of 1983 South zone if the geo-dataset is maintained as a statewide layer or, a regional layer crossing zones.
- Standard unit of measure is US Survey Foot. For agencies that must maintain unit of measure in meters, the standard conversion of coordinates between the meter and the US survey foot shall be based upon the length of the meter being equal to exactly 39.37 inches.

Geographic Coordinate System

- Alternately, geospatial data may be stored in geographic coordinates on the North American Datum of 1983/91, in decimal degrees with negative West longitudes and positive North latitudes.
- Geographic coordinates (latitude & longitude values) on a geo-centric datum comprise a reference system for measuring Earth locations. This system provides a continuous, consistent reference framework for locating features anywhere in the state and beyond. The system is readily compatible with global positioning system data and is the reference system intended for Washington State Geospatial Framework data.

7.0 Stewardship

7.1 Update Cycles

- Need decisions on best available data for each data layer and/or scale.
- Here data could be submitted to source agency when concatenating with tabular or spatial data. If this is acceptable this will reduce the need to concatenate data repeatedly with each update cycle.
- Also will need to define a regular update cycle for data. Many agencies have an annual update cycle based on budget cycle. Would this dictate framework update cycle? Yearly updates, quarterly?

8.0 Data Layers

8.1 Core Data Sets:

- State Highway
- Highway Ramps – WSDOT naming convention
- Milepoint / Milepost
- Scenic Roads - attribute
- Local Roads
- Tribal Road Designators
- Non-Motorized Transportation Modes
- Railroads

- Port Facilities
- Ferry Transit Routes – include ferry terminal locations, includes staging areas as segments and connector roads
- Aviation – includes airport locations, connector roads and runway segments

8.2 Reference (Boundary) Datasets:

- County Boundaries
- Reservation Boundaries
- Urbanized Areas

8.3 Supporting Datasets:

- CRIS Data – Core attribution
- Survey Data – Core attribution
- Bridges, culverts – attribute (event), eventually BEarms for bridge

8.4 Interfaces

- Mobility
- Geospatial One-stop

9.0 References

- All Roads (HARP), ODT, Watterson and Brady, 2003 v5 draft
- ANSIT, Geographic Information Framework-Data Content Standards for Transportation Networks: Roads
- Oregon Road Centerline Standard, ODT, V.2, 2003 draft
- Michigan Framework – web
 - http://www.michigan.gov/cgi/0,1607,7-158-12759_14194---,00.html
- Arizona Framework – web
- Dueker white paper
- King Co Standards
 - http://www.metrogis.org/data/standards/address_guidelines.shtml
- Minnesota Data Standards
 - <http://www.co.clay.mn.us/Depts/GIS/GISDStan.htm>
- [1] WAGIC Metadata
 - http://wagic.wa.gov/techstds2/wl_subsetv1.htm
- Geospatial One Stop
 - <http://www.geo-one-stop.gov/Standards/Base/index.html>

APPENDIX – A

Related Roadway Type (RRT)

Before TRIPS, the SR number represented the main traveled way of our highways. This left out other pieces of our highways like Ramps, Spurs, Couplets, etc. and in numerous cases, caused location data to be inaccurate.

With TRIPS came RRT and RRQ. Together with the SR number, these descriptors identify very precisely any piece of the highway system in the State.

RRT = A two character abbreviation for a type of roadway. The following is a list of RRTs in the system.

| | | | |
|----|-----------------------|---------|------------------------------|
| AR | Alternate Route | CD | Collector Distributor Dec |
| CO | Couplet | CI | Collector Distributor Inc |
| FD | Frontage Road Dec | LX | Crossroad within Interchange |
| FI | Frontage Road Inc | P1 - P9 | Off Ramp, Inc |
| FS | Ferry Ship (Boat) | PU | Extension of P ramp |
| FT | Ferry Terminal | Q1 - Q9 | On Ramp, Inc |
| PR | Proposed Route | QU | Extension of Q ramp |
| RL | Reversible Lane | R1 - R9 | Off Ramp, Dec |
| SP | Spur | RU | Extension of R ramp |
| TB | Transitional Turnback | S1 - S9 | On Ramp, Dec |
| TR | Temporary Route | SU | Extension of S ramp |

Related Roadway Qualifier (RRQ)

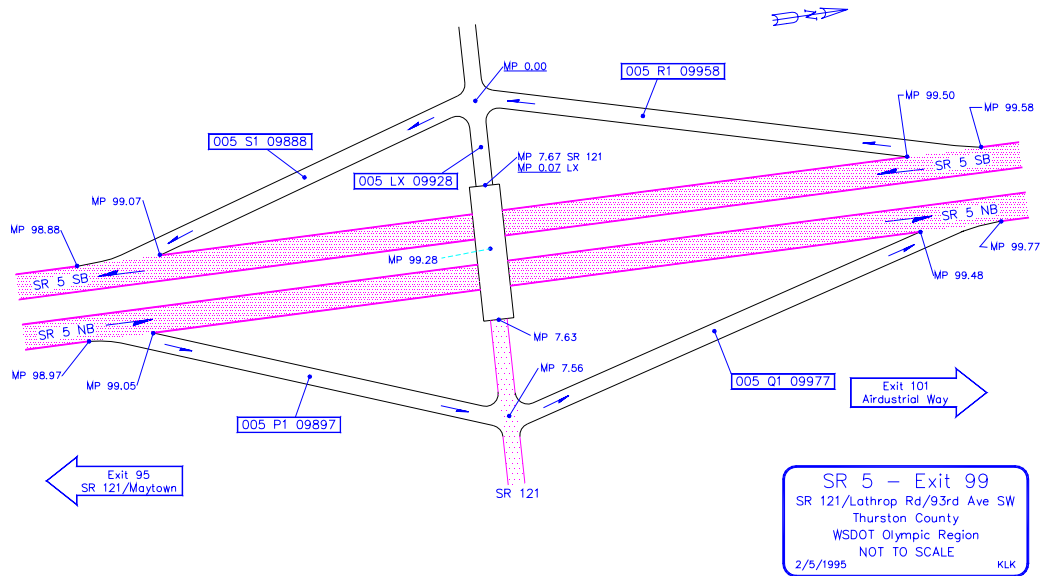
The RRQ is a six digit field which uniquely identifies the RRT since there may be more than one of the same type of RRT for a route. The assigning of RRQ is done in one of three ways depending on the RRT.

- (2) The following RRTs use the Mainline SRMP where the RRT attaches to the Mainline. The begin SRMP for that RRT will be 0.000.

| | | | |
|----|------------------------------|---------|---------------------|
| CD | Collector Distributor Dec | P1 - P9 | Off Ramp, Inc |
| CI | Collector Distributor Inc | PU | Extension of P ramp |
| FD | Frontage Road Dec | Q1 - Q9 | On Ramp, Inc |
| FI | Frontage Road Inc | QU | Extension of Q ramp |
| LX | Crossroad within Interchange | R1 - R9 | Off Ramp, Dec |
| RL | Reversible Lane ** | RU | Extension of R ramp |
| | | S1 - S9 | On Ramp, Dec |
| | | SU | Extension of S ramp |

**** At this time, this RRT does not follow standard naming convention**

DIAMOND INTERCHANGE EXAMPLE

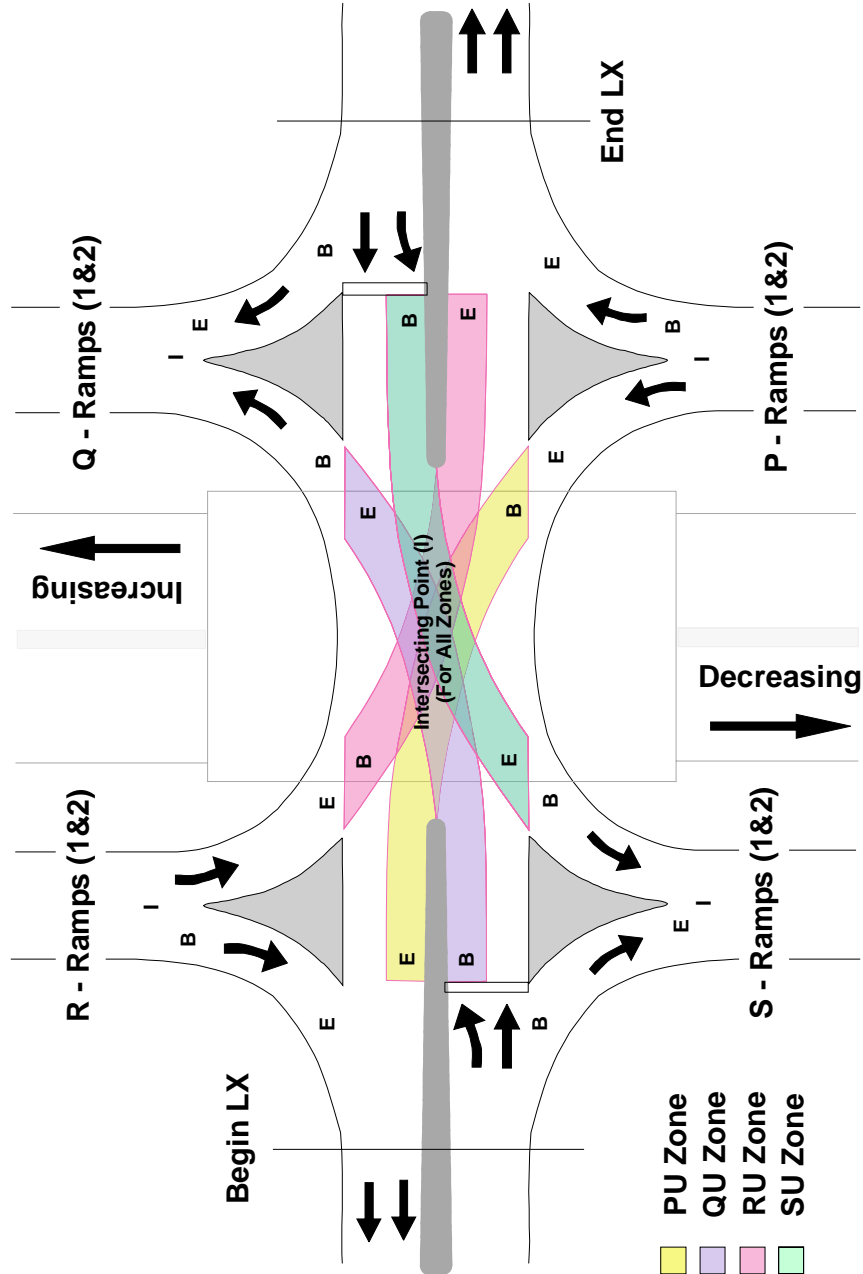


EXAMPLE: 005 R1 09958

Where:

| | | |
|-------|---|---|
| 005 | = | SR Number |
| R1 | = | RRT for decreasing MP direction off-ramp (R ramp) |
| 09958 | = | Mainline SRMP at beginning of the R ramp where the R ramp leaves the mainline |

TYPICAL SINGLE POINT (URBAN) INTERCHANGE CONFIGURATION



EXAMPLE: 101 RU 36542

Where: 005 = SR Number
 RU = RRT for extension of R ramp to LX tangent
 36542 = Mainline SRMP at beginning of the R ramp where the R ramp leaves the mainline